

A component carrier 1 provided to accommodate plug-in modules 2 includes two front module rails 3 and two rear module rails, (not visible). These four module rails 3 which are made of aluminum profiles and are arranged parallel to one another and in a horizontal plane, connect the two side walls 4 of component carrier 1 which are equipped with holding strips 5 that are bent at an angle at the front and serve to fasten the component carrier 1 in an equipment cabinet (not shown) or the like. Component carrier 1 together with side walls 4, a top 6 and a rear wall as well as a bottom (the latter two not visible) is tightly sealed against high frequencies, with suitable measures being taken at the abutting edges of all components forming component carrier 1 to ensure a tight seal. Col. 3, line 60 to Col. 4, line 6.

Mazura further describes the plug-in modules and a removable handle as follows:

Each plug-in module 2 is essentially composed of a circuit board 7 and a front panel 8. Circuit board 7 is equipped with electronic and electrical components that are interconnected by means of metal conductor paths. With the aid of plug-in connections and a rear wall plate, the plug-in modules are in communication with one another within the component carrier. Each circuit board 7 is guided in guide rails that extend between the front and rear module rails 3. The front edge of circuit board 7 is fastened at a right angle to a front panel 8 which is provided at the bottom of its frontal face with a pivotal removal handle 9 that cooperates by means of a groove 10 with a removal edge 11 in the lower front module rail 3 when plug-in module 2 is pulled out (and also when it is inserted). Col. 4, lines 7-21.

Mazura discloses a seal for providing electrical contacts as follows:

The use of shielded, high frequency tight component carriers and the engineering measures taken in this connection are known. Housings for such components avoid as much as possible any parting grooves between the individual housing components or they are sealed with seals that provide electrical contacts. Problems arise in this connection from the unavoidable gaps between the plug-in modules that can be pushed into and out of such component carriers, whose front panels are in juxtaposition and form the front of the component carrier.

In order to seal the longitudinal gaps between the front panels of the plug-in modules, spring strips are known in various embodiments which, once the plug-in modules have been inserted, establish a plurality of electrical contacts with the longitudinal edges of the respectively adjacent front panels. Col. 1, lines 30-46.

...

Front panel 8 has a U-shaped cross section (see also FIG. 2) and is provided at one of its long sides 12 with a spring contact strip 13 equipped with a plurality of closely spaced elastic spring leaves 14 which, when plug-in module 2 is inserted, lay themselves against the smooth long side 15 of the adjacent front panel 8 facing them (see FIG. 3). They establish a

row of electrical contacts, thus preventing the escape as well as the inward penetration of electromagnetic, high frequency interfering fields through the longitudinal gaps 16 disposed between front panels 8. Col. 4, lines 22-32.

Claims 1, 13, and 22-24

However, Mazura fails to disclose where “each PCB module includes a faceplate and a connector assembly disposed opposite said faceplate such that each PCB module is enclosed” as recited in claim 1 (and claims 1-4, 13, 19, 20, and 22, which variously depend from claim 1) and “each PCB module is enclosed” as recited in claim 24.

Although Mazura discloses a form of communication between the plug-in modules, namely, the plug-in connections and the rear wall plate, Mazura fails to disclose “a connector assembly disposed opposite said faceplate such that each PCB module is enclosed” as recited in claim 1 and “each PCB module is enclosed” as recited in claim 24. Indeed, the “rear wall plate” which is common to all the plug-in modules in Mazura teaches away from the present invention where “each PCB module includes a faceplate and a connector assembly disposed opposite said faceplate such that each PCB module is enclosed” as recited in claim 1 and “each PCB module is enclosed” as recited in claim 24 (emphasis added). In this manner, Mazura has a common rear wall plate, whereas, in claim 1, each PCB module has a faceplate and a connector assembly, not one common assembly. As such, each PCB module in claims 1 and 24 is enclosed.

Claim 2

Mazura fails to disclose “a first screw for attaching said first end of said face plate to said chassis; and a second screw for attaching said second end of said face plate to said chassis” as recited in claim 2. Although “each front panel is provided at its top and bottom near its transverse edges 18 with a fastening screw 19 having a slotted screw head 20” in Mazura, this configuration is “to enable the front panels 8 of the plug-in modules 2 to be screwed to module rails 3” and not to component carrier 1. As such, Mazura fails to disclose where a screw attaches the face plate to the chassis; rather, Mazura uses fastening screw 19 to enable front panels 8 to be screwed to module rails 3.

Claims 3 and 4

The Office alleges that Mazura discloses where “said first screw (19) is configured as a jackscrew, and said first and second screw (19) are configured to clutch when said screws are

tightened to apply a predetermined amount of force between said faceplate (8) of said printed circuit board module and said cabinet” without citation to a relevant passage in Mazura.

Although Applicant has carefully reviewed Mazura, Applicant has not identified an express or implied disclosure of a jack screw. Mazura discloses “headless screws” (Col. 4, lines 55-60); however, Mazura fails to disclose where “said first screw is configured as a jack screw” as recited in claim 3 and “said first and second screws are configured to clutch when said screws are tightened to apply a predetermined amount of force between said face plate of the PCB module and said chassis” as recited in claim 4. Applicant respectfully requests clarification from the Office.

Claims 19 and 20

Mazura fails to disclose where “each slot in said chassis has one guide rail mounted on said top panel and one guide rail mounted on said bottom panel, wherein said guide rails are centrally mounted with respect to each slot” as recited in claim 20 (emphasis added). Mazura discloses “four module rails 3 which are made of aluminum profiles and are arranged parallel to one another and in a horizontal plane, [and] connect the two side walls 4 of component carrier 1 which are equipped with holding strips 5”. Indeed, as illustrated in Figure 1 of Mazura, rails 3 connect the two side walls 4, so that they cannot be “centrally mounted with respect to each slot” as recited in claim 20.

Accordingly, Applicant respectfully submits that each and every element of the claims are not disclosed by Mazura, and therefore not anticipated by Mazura. Therefore, Applicant respectfully requests the withdrawal of the rejection of claims 1-4, 13, 19, 20, and 22-24 over Mazura.

35 U.S.C. § 103 REJECTIONS

Applicant respectfully believes that the § 103 rejections contained within the Office Action are now moot, since they apply to claims that depend from independent claims that are patentable in light of the foregoing arguments. Nevertheless, Applicant further distinguishes the references.

Claim 5

The Office rejected claim 5 under 35 U.S.C. § 103(a) as being unpatentable over Mazura. Applicant respectfully traverses this rejection.

The Office alleges that "Mazura disclose and satisfy the claimed invention except for the predetermined amount of force is about 70 pounds per screw". The Office argues that "it would have been obvious to one having ordinary skill in the art at the time of the invention to apply the force to fasten the screw on the module for secured the module within the cabinet, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art" (citing In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)).

Applicants respectfully note that the Examiner provides no prior art teaching or suggestion which would provide a basis for the Examiner's conclusions. The Examiner may take official notice of facts outside the record which are well known in the art. The particular "load of about 70 pounds per screw", however, is not known or disclosed and cannot fairly be construed as "well-known". Accordingly, Applicant respectfully requests that the Examiner cite a reference in support of his or her position under M.P.E.P. § 2144.03.

A "jack screw" is a mechanical device, where a screw applies a certain amount of force to lift or push a load. Accordingly, Mazura does not teach that the "headless screw" is a jack screw or that any amount of force is applied by the screw to clutch or hold the module to the chassis. As such, Mazura fail to teach, advise, or suggest where "said predetermined amount of force applies a load of about 70 pounds per screw" as recited in claim 5. Mazura fail to teach, advise, or suggest one or more of the missing claimed elements of claim 5. Therefore, claim would not have been obvious to a person of ordinary skill in the art, so that claim 5 is patentable over Mazura.

Claims 14-18

The Office rejected claims 14-18 under 35 U.S.C. § 103(a) as being unpatentable over Mazura in view of McCarthy, U.S. Patent No. 5,398,822, issued March 21, 1995 ("McCarthy"). Applicant respectfully traverses this rejection.

Mazura fails to teach, advise, or suggest where "said top panel and said bottom panel are interchangeable" as recited in claim 14 or where "said first side panel and said second side panel are interchangeable" as recited in claim 15. The Office argues that "a part of the cabinet may be relocated without modification to the operation of the cabinet", so that "such a relocation is considered to have been within the skill of art" (citing In re Japikse 86 USPQ 70 (1950)). Clearly, interchangeable panels are not a mere relocation of parts falling under In re Japikse.

The present application recognizes that interchangeable panels simplify assembly and reduce the number of required parts. Present Application, lines 8-13. Alternatively, for example, McCarthy distinguishes top chamber 12 from "open" bottom compartment 16 indicating they would not be interchangeable. It is evident that where two elements are identical in McCarthy, it is so indicated (e.g., wave or card guide 30 and identical mirror image wave or card guide 32 are so indicated). In this manner, McCarthy addresses a different need by making the top and bottom chamber and compartment distinguishable and unique. Mazura, on the other hand, does not even recognize this feature and therefore fails to address it.

McCarthy also fails to teach, advise, or suggest where "said ventilation holes are less than about 0.09 inches in diameter" as recited in claim 18. The Office argues that it would have been "an obvious matter of design choice to make as small (diameter) as possible to reduce the amount of space, since such a modification would have involved a mere change in this size of the hole". The Office further alleges that a "change in size is generally recognized as being within the level of ordinary skill in the art" (citing In re Rose, 105 USPQ 237 (CCPA 1955)).

However, the size of the holes was carefully considered in McCarthy as follows:

Because there is no source of EMI/RFI emissions adjacent the openings 55, these openings are slightly larger than openings 56 to allow greater air flow...the size of each of the openings 55 is approximately 11.75 mm X 18.7 mm and 11.9 mm deep...The size and depth of the openings 56 are chosen to balance the functional requirement of providing a Faraday shield preventing RFI/EMI emissions and yet permitting sufficient air flow through the card cage to dissipate the heat generated by the electronics without causing acoustic noise. Col. 6, lines 25-44.

As such, the holes were not merely chosen to be as small as possible to save space, but rather to balance the functional requirements of a Faraday shield and sufficient air flow. Indeed, 0.09 inches is about 2.3 mm. In this manner, a rectangular hole of approximately 11.75 mm X 18.7 mm and 11.9 mm deep is not a hole less than about 2.3 mm (i.e., about 0.09 inches). Accordingly, McCarthy fails to teach, advise, or suggest where "said ventilation holes are less than about 0.09 inches in diameter" as recited in claim 18.

Applicant further submits that the cited art of record contains no teaching, suggestion, or motivation to combine the references as proposed by the Office. See ACS Hosp. Systems, Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577 (Fed. Cir. 1984) (teachings of the prior art can be combined to show obviousness only if there is some suggestion or teaching to do so). Accordingly, the Office is impermissibly using hindsight reasoning in an attempt to recreate the

claimed invention with Applicant's disclosure as the basis. Thus, without using impermissible hindsight reasoning, it would not have been obvious to one of ordinary skill in the art at the time of the invention to modify McCarthy and/or Mazura to include the missing claimed elements. Regardless, Mazura in view of McCarthy fails to teach, advise, or suggest the missing claimed elements. Therefore, claims 14-18 are patentable over Mazura in view of McCarthy.

Claims 6, 7, and 9-11

The Office rejected claims 6, 7, and 9-11 under 35 U.S.C. § 103(a) as being unpatentable over Mazura in view of Martin, U.S. Patent No. 5,424,916, issued June 13, 1995 ("Martin"). Applicant respectfully traverses this rejection.

The Office alleges that Martin discloses "a module (30) having first and second printed circuit boards (32-34-figure 2) connected to a connector assembly (50) with 90 degrees lead and without using ribbon cables". The Office argues that it would have been obvious to one of ordinary skill in the art at the time of invention "to modify the cabinet of Mazura and provide the module having more than one circuit board connected to the connector assembly as taught by Martin in order to reduce an electrical connection between two boards and backplane connector of the cabinet".

Martin discloses a combination conductive and convective heatsink for use in an electronic module. A heatsink member 10 includes first and second major planar surfaces 12 and 14, respectively. Adjacent surfaces 12 and 14 is an object from which heat is to be transferred, where the object is an electronic circuit board. The conductive and flow-through heatsink uses heat pipes 18a-18d and 23 with flow-through passage areas 20a-20e. Heat pipes 18a-18d and 23 are used to conduct heat from surfaces 12 and 14 to a mounting rack 42. For example, heat pipe 18b is a conventional heat pipe having wicking material 22 located on the inner surface of the pipe. Alternatively, solid heat pipe 23 has carbon fibers 24 oriented to conduct heat from surfaces 12 and 14 to mounting rack 42. Conductive and convective heatsink 10a is used with electronic module 30 having first and second electronic circuit boards 32 and 34. Electronic module 30 is mounted in mounting rack 42 having side walls 41 and 43, motherboard 44, and connectors 46a-46c. A "recess 48 guides electronic module 30 into mounting rack 42 until electronic module connector 50 and connector pins 51 engage and mate with mother board connector 46b". Col. 4 to Col. 5.

Accordingly, even the combination of Mazura in view of Martin fails to teach, advise, or suggest a PCB module having “a first circuit board having a first end connected to said face plate and an opposite second end connected to said connector assembly; and a second circuit board having a first end connected to said face plate and an opposite second end connected to said connector assembly” as recited in claim 6. Mazura in view of Martin also fails to teach, advise, or suggest a PCB module having a connector assembly where “said connector assembly further comprises a plurality of connectors for connecting to wire harnesses” as recited in claim 7 (and claims 9-11, which variously depend from claim 7).

As described above, each “plug-in module 2 is essentially composed of a circuit board 7 and a front panel 8”. As such, plug-in module 2 of Mazura is compact compared to electronic module 30 of Martin having first and second electronic circuit boards 32 and 34 mounted on heatsink member 10a. Consequently, attempting to insert the electronic module 30 of Martin having first and second electronic circuit boards 32 and 34 and heatsink member 10a into plug-in module 2 of Mazura would render Mazura inoperable for its intended use. Accordingly, Mazura differs from Martin in connection with the definition of “module” and, consequently, how the electronic module 30 (i.e., circuit boards 32 and 34 and heatsink 10a) would fit into the rack or carrier. The electronic module 30 (i.e., circuit boards 32 and 34 and heatsink 10a) of Martin could not fit in the space made for plug-in module 2. Thus, Mazura clearly differs from Martin, and attempting to modify Mazura with the electronic module 30 of Martin would render Mazura inoperable for its intended use.

Regardless, Applicant submits that the cited art of record contains no teaching, suggestion, or motivation to combine the references as proposed by the Office. See ACS Hosp. Systems, Inc. at 1577 (teachings of the prior art can be combined to show obviousness only if there is some suggestion or teaching to do so). Accordingly, the Office is picking and choosing the various missing claimed elements in an attempt to recreate the claimed invention with Applicant’s disclosure as the basis. Thus, without using impermissible hindsight reasoning, it would not have been obvious to one of ordinary skill in the art at the time of the invention to modify Mazura in view of Martin to include the missing claimed elements. Regardless, Mazura in view of Martin fails to teach, advise, or suggest the missing claimed elements. Therefore, claims 6, 7, and 9-11 are patentable over Mazura in view of Martin. STOP

Claims 12 and 21

The Office rejected claims 12 and 21 under 35 U.S.C. § 103(a) as being unpatentable over Mazura in view of Martin and further in view of McKenzie, U.S. Patent No. 4,002,386, issued January 11, 1977 ("McKenzie"). Applicant respectfully traverses this rejection.

The McKenzie reference discloses a handle, which locks in place to prevent it from pinching fingers against the printed circuit boards since there is no face plate covering the PCB. As part of the locking mechanism, a plurality of pulling pins are disclosed that interact with slots in the handle to keep it in a locked position.

However, the combination of Mazura in view of McCarthy and in further view of McKenzie fails to teach, advise, or suggest a face plate having "a slot formed therein", "a flexible handle member having substantially the same dimensions as said slot", where the flexible handle member is "configured to move between a retracted position and a use position", and where the flexible handle member lies within the "slot in said retracted position and said flexible handle member extends out from said slot in said use position" as recited in claim 12. Furthermore, Mazura in view of McCarthy and in further view of McKenzie fails to teach, advise, or suggest a retainer member configured to attach the first end of the flexible handle member to the first end of the slot such that the flexible handle member is configured to move between a retracted position and a use position, where the first end of the flexible handle member does not move when the flexible handle member moves between the retracted position and the use position as recited in claim 21.

Upon careful examination of the cited figures and the accompanying text of McKenzie, col. 2, lines 39-47, it is apparent that the handle is not slideably attached, but rather is attached to pins mounted in the printed circuit board. Slots in the handle move the handle over a pin to a keyhole 50/51 in the slot, which then locks the handle in position. As such, McKenzie teaches a handle arrangement that requires pins to be mounted directly on to the printed circuit board and handle ends, which lock the handle in position. Indeed, the McKenzie reference teaches away from the claimed invention in that the handle in McKenzie is made to lock into position. In addition, modifying the handle in McKenzie to include the missing claimed elements would render McKenzie improper for its intended purpose, namely to lock the handle in position. Consequently, even a combination of Mazura in view of McCarthy and in further view of McKenzie fails to teach, advise, or suggest the claimed invention as recited in claims 12 and 21.

Furthermore, Applicant submits that the cited art of record contains no teaching, suggestion, or motivation to combine the references as proposed by the Office. See ACS Hosp. Systems, Inc. at 1577 (teachings of the prior art can be combined to show obviousness only if there is some suggestion or teaching to do so). Accordingly, the Office is picking and choosing the various missing claimed elements in an attempt to recreate the claimed invention with Applicant's disclosure as the basis. Thus, without using impermissible hindsight reasoning, it would not have been obvious to one of ordinary skill in the art at the time of the invention to modify Mazura in view of McCarthy and in further view of McKenzie to include the missing claimed elements. Regardless, Mazura in view of McCarthy and in further view of McKenzie fails to teach, advise, or suggest the missing claimed elements. Therefore, claims 12 and 21 are patentable over Mazura in view of McCarthy and in further view of McKenzie.

CONCLUSION

The Applicant respectfully submits that the present application is in condition for allowance because all claims patentably distinguish the prior art of record. Reconsideration of the application is thus requested. Applicant invites the Office to telephone the undersigned if he or she has any questions whatsoever regarding this Response or the present application in general.

Respectfully submitted,

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Date

By:

Michael K. Kelly
Michael K. Kelly
Reg. No. 32,848

Attorney for:
Honeywell International, Inc.
Law Dept. AB2
P.O. Box 2245
Morristown, New Jersey 07962-9806
Phone: (602) 382-6306
Fax: (602) 382-6070
E-mail: sshahpar@swlaw.com
1188667.3